

SEQUENCE LISTING

<110> Colgan, Sean

<120> Compositions and Methods for Treating Hematologic Malignancies and Multiple Drug Resistance

<130> B0801/7233 (ERP)

<150> US 60/243,542

<151> 2000-10-26

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<170> PatentIn version 3.1

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Ser Tyr Leu Arg Val Arg Lys Leu Leu Asp Ala Gly Asp Leu Asp Ile
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Asp Gly Phe Val Met Val Leu Thr Asp Asp Gly Asp Met Ile Tyr Ile
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Ser Asp Asn Val Asn Lys Tyr Met Gly Leu Thr Gln Phe Glu Leu Thr
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Ser Arg Gly Arg Thr Met Asn Ile Lys Ser Ala Thr Trp Lys Val Leu
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His Cys Thr Gly His Ile His Val Tyr Asp Thr Asn Ser Asn Gln Pro
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Gln Cys Gly Tyr Lys Lys Pro Pro Met Thr Cys Leu Val Leu Ile Cys
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Glu Arg Ile Thr Glu Leu Met Gly Tyr Glu Pro Glu Glu Leu Leu Gly
260 265 270

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Glu Ala Lys Asn Pro Phe Ser Thr Gln Asp Thr Asp Leu Asp Leu Glu
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565 570 575

Phe Asp Gln Leu Ser Pro Leu Glu Ser Ser Ser Ala Ser Pro Glu Ser
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Ala Ser Pro Gln Ser Thr Val Thr Val Phe Gln Gln Thr Gln Ile Gln
595 600 605

Glu Pro Thr Ala Asn Ala Thr Thr Thr Thr Ala Thr Thr Asp Glu Leu
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Lys Thr Val Thr Lys Asp Arg Met Glu Asp Ile Lys Ile Leu Ile Ala
625 630 635 640

Ser Pro Ser Pro Thr His Ile His Lys Glu Thr Thr Ser Ala Thr Ser
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Ser Pro Tyr Arg Asp Thr Gln Ser Arg Thr Ala Ser Pro Asn Arg Ala
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Gly Lys Gly Val Ile Glu Gln Thr Glu Lys Ser His Pro Arg Ser Pro
675 680 685

Asn Val Leu Ser Val Ala Leu Ser Gln Arg Thr Thr Val Pro Glu Glu
690 695 700

Glu Leu Asn Pro Lys Ile Leu Ala Leu Gln Asn Ala Gln Arg Lys Arg
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Lys Met Glu His Asp Gly Ser Leu Phe Gln Ala Val Gly Ile Gly Thr
725 730 735

Leu Leu Gln Gln Pro Asp Asp His Ala Ala Thr Thr Ser Leu Ser Trp
740 745 750

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Lys Thr Ile Ile Leu Ile Pro Ser Asp Leu Ala Cys Arg Leu Leu Gly
770 775 780

Gln Ser Met Asp Glu Ser Gly Leu Pro Gln Leu Thr Ser Tyr Asp Cys
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| cctctggaaa | ctctggacct | ggaattcaag | gtggaggagc | cattgtccag | agggttatta | 180 |
| agcggcgacc | agggttggat | tttgatgatg | atggagaagg | gaacagtaaa | tttttgaggt | 240 |
| gtgatgatga | tcagatgtct | aacgataagg | agcggtttgc | caggtcggat | gatgagcaga | 300 |
| gctctgcgga | taaagagaga | cttgccaggg | aaaatcacag | tgaaattgaa | cggcgggcgac | 360 |
| ggaacaagat | gacagcctac | atcacagaac | tgtcagatat | ggtaccacc | tgtagtgccc | 420 |
| tggtctgaaa | accagacaag | ctaaccatct | tacgcatggc | agtttctcac | atgaagtcct | 480 |
| tgcggggaac | tggcaacaca | tccactgatg | gctcctataa | gccgtctttc | ctcactgatc | 540 |
| aggaactgaa | acatttgatc | ttggaggcag | cagatggctt | tctgtttatt | gtctcatgtg | 600 |
| agacaggcag | ggtggtgtat | gtgtctgact | ccgtgactcc | tgttttgaac | cagccacagt | 660 |
| ctgaatgggt | tggcagcaca | ctctatgatc | agggtgcacc | agatgatgtg | gataaaacttc | 720 |
| gtgagcagct | ttccacttca | gaaaatgccc | tgacagggcg | tatcctggat | ctaaagactg | 780 |
| gaacagtga | aaaggaaggt | cagcagtctt | ccatgagaat | gtgtatgggc | tcaaggagat | 840 |
| cgtttatttg | ccgaatgagg | tgtggcagta | gctctgtgga | cccagtttct | gtgaataggc | 900 |
| tgagctttgt | gaggaacaga | tgaggaatg | gacttgggtc | tgtaaaggat | ggggaacctc | 960 |

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Gly Gly Ala Ile Val Gln Arg Ala Ile Lys Arg Arg Pro Gly Leu Asp
35 40 45

Phe Asp Asp Asp Gly Glu Gly Asn Ser Lys Phe Leu Arg Cys Asp Asp
50 55 60

Asp Gln Met Ser Asn Asp Lys Glu Arg Phe Ala Arg Ser Asp Asp Glu
65 70 75 80

Gln Ser Ser Ala Asp Lys Glu Arg Leu Ala Arg Glu Asn His Ser Glu
85 90 95

Ile Glu Arg Arg Arg Arg Asn Lys Met Thr Ala Tyr Ile Thr Glu Leu
100 105 110

Ser Asp Met Val Pro Thr Cys Ser Ala Leu Ala Arg Lys Pro Asp Lys
115 120 125

Leu Thr Ile Leu Arg Met Ala Val Ser His Met Lys Ser Leu Arg Gly
130 135 140

Thr Gly Asn Thr Ser Thr Asp Gly Ser Tyr Lys Pro Ser Phe Leu Thr
145 150 155 160

Asp Gln Glu Leu Lys His Leu Ile Leu Glu Ala Ala Asp Gly Phe Leu
165 170 175

Phe Ile Val Ser Cys Glu Thr Gly Arg Val Val Tyr Val Ser Asp Ser
180 185 190

Val Thr Pro Val Leu Asn Gln Pro Gln Ser Glu Trp Phe Gly Ser Thr
195 200 205

Leu Tyr Asp Gln Val His Pro Asp Asp Val Asp Lys Leu Arg Glu Gln
210 215 220

115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400

Pro Tyr Ser Asp Glu Ile Glu Tyr Ile Ile Cys Thr Asn Thr Asn Val
450 455 460

Pro Gly Ala Ala Ala Tyr Pro Ser Leu Thr Asn Arg Gly Ser Asn Phe
690 695 700

Ala Pro Glu Thr Gly Gln Thr Ala Gly Gln Phe Gln Thr Arg Thr Ala
705 710 715 720

Glu Gly Val Gly Val Trp Pro Gln Trp Gln Gly Gln Gln Pro His His
725 730 735

Arg Ser Ser Ser Ser Glu Gln His Val Gln Gln Pro Pro Ala Gln Gln
740 745 750

Pro Gly Gln Pro Glu Val Phe Gln Glu Met Leu Ser Met Leu Gly Asp
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| ttcacttcaa agtgaaaatg acaacacatc tcaagaaact caaagaatca tactgtcaaa | 240 |
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| atcactactcc aaaagaactg ggaatggagg aagaagatgt gattgaagtt tatcaggaac | 360 |
| aaacgggggg tcattcaaca gtttagatat tcttttttatt ttttttcttt tccctcaatc | 420 |
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| ggcttggtgg gataaataag atcgaccaat gcaagtgttc ataatgactt tccaattggc | 720 |
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Glu Ile His Phe Lys Val Lys Met Thr Thr His Leu Lys Lys Leu Lys
 35 40 45

Glu Ser Tyr Cys Gln Arg Gln Gly Val Pro Met Asn Ser Leu Arg Phe
 50 55 60

Leu Phe Glu Gly Gln Arg Ile Ala Asp Asn His Thr Pro Lys Glu Leu
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Gly Met Glu Glu Glu Asp Val Ile Glu Val Tyr Gln Glu Gln Thr Gly
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Gly His Ser Thr Val
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20           25          30

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Val Phe Tyr Glu Leu Ala His Glu Leu Pro Leu Pro His Ser Val Ser

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| 50 | | | | | | 55 | | | | | 60 | | | | |
| Arg | Thr | His | Lys | Leu | Leu | Ser | Ser | Val | Cys | Ser | Glu | Asn | Glu | Ser | Glu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Ala | Glu | Ala | Asp | Gln | Gln | Met | Asp | Asn | Leu | Tyr | Leu | Lys | Ala | Leu | Glu |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Gly | Phe | Ile | Ala | Val | Val | Thr | Gln | Asp | Gly | Asp | Met | Ile | Phe | Leu | Ser |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Glu | Asn | Ile | Ser | Lys | Phe | Met | Gly | Leu | Thr | Gln | Val | Glu | Leu | Thr | Gly |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| His | Ser | Ile | Phe | Asp | Phe | Thr | His | Pro | Cys | Asp | His | Glu | Glu | Ile | Arg |
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| Glu | Asn | Leu | Ser | Leu | Lys | Asn | Gly | Ser | Gly | Phe | Gly | Lys | Lys | Ser | Lys |
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| Asp | Met | Ser | Thr | Glu | Arg | Asp | Phe | Phe | Met | Arg | Met | Lys | Cys | Thr | Val |
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| | | | 180 | | | | | 185 | | | | | 190 | | |
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| Leu | Gly | Arg | Ser | Ala | Tyr | Glu | Phe | Tyr | His | Ala | Leu | Asp | Ser | Glu | Asn |

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| Gly Gln Tyr Arg Met Leu Ala Lys His Gly Gly Tyr Val Trp Leu Glu | | | | |
| 305 | | 310 | | 315 |
| Thr Gln Gly Thr Val Ile Tyr Asn Pro Arg Asn Leu Gln Pro Gln Cys | | | | |
| | 325 | | 330 | 335 |
| Ile Met Cys Val Asn Tyr Val Leu Ser Glu Ile Glu Lys Asn Asp Val | | | | |
| | 340 | | 345 | 350 |
| Val Phe Ser Met Asp Gln Thr Glu Ser Leu Phe Lys Pro His Leu Met | | | | |
| | 355 | | 360 | 365 |
| Ala Met Asn Ser Ile Phe Asp Ser Ser Gly Lys Gly Ala Val Ser Glu | | | | |
| | 370 | | 375 | 380 |
| Lys Ser Asn Phe Leu Phe Thr Lys Leu Lys Glu Glu Pro Glu Glu Leu | | | | |
| 385 | | 390 | | 395 |
| Ala Gln Leu Ala Pro Thr Pro Gly Asp Ala Ile Ile Ser Leu Asp Phe | | | | |
| | 405 | | 410 | 415 |
| Gly Asn Gln Asn Phe Glu Glu Ser Ser Ala Tyr Gly Lys Ala Ile Leu | | | | |
| | 420 | | 425 | 430 |
| Pro Pro Ser Gln Pro Trp Ala Thr Glu Leu Arg Ser His Ser Thr Gln | | | | |
| | 435 | | 440 | 445 |
| Ser Glu Ala Gly Ser Leu Pro Ala Phe Thr Val Pro Gln Ala Ala Ala | | | | |
| 450 | | 455 | | 460 |
| Pro Gly Ser Thr Thr Pro Ser Ala Thr Ser Ser Ser Ser Cys Ser | | | | |
| 465 | | 470 | | 475 |
| Thr Pro Asn Ser Pro Glu Asp Tyr Tyr Thr Ser Leu Asp Asn Asp Leu | | | | |
| | 485 | | 490 | 495 |
| Lys Ile Glu Val Ile Glu Lys Leu Phe Ala Met Asp Thr Glu Ala Lys | | | | |
| | 500 | | 505 | 510 |
| Asp Gln Cys Ser Thr Gln Thr Asp Phe Asn Glu Leu Asp Leu Glu Thr | | | | |

| | | | | | | | | | | | | | | | |
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| Leu | Ala | Pro | Tyr | Ile | Pro | Met | Asp | Gly | Glu | Asp | Phe | Gln | Leu | Ser | Pro |
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| Ile | Cys | Pro | Glu | Glu | Arg | Leu | Leu | Ala | Glu | Asn | Pro | Gln | Ser | Thr | Pro |
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| Glu | Ser | Lys | Lys | Thr | Glu | Pro | Glu | His | Arg | Pro | Met | Ser | Ser | Ile | Phe |
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| Phe | Asp | Ala | Gly | Ser | Lys | Ala | Ser | Leu | Pro | Pro | Cys | Cys | Gly | Gln | Ala |
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| Ser | Thr | Pro | Leu | Ser | Ser | Met | Gly | Gly | Arg | Ser | Asn | Thr | Gln | Trp | Pro |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |
| Pro | Asp | Pro | Pro | Leu | His | Phe | Gly | Pro | Thr | Lys | Trp | Ala | Val | Gly | Asp |
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| Gln | Arg | Thr | Glu | Phe | Leu | Gly | Ala | Ala | Pro | Leu | Gly | Pro | Pro | Val | Ser |
| | | | 660 | | | | | 665 | | | | | 670 | | |
| Pro | Pro | His | Val | Ser | Thr | Phe | Lys | Thr | Arg | Ser | Ala | Lys | Gly | Phe | Gly |
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| Ala | Arg | Gly | Pro | Asp | Val | Leu | Ser | Pro | Ala | Met | Val | Ala | Leu | Ser | Asn |
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| Lys | Leu | Lys | Leu | Lys | Arg | Gln | Leu | Glu | Tyr | Glu | Glu | Gln | Ala | Phe | Gln |
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| Trp | Lys | Arg | Met | Lys | Asn | Leu | Arg | Gly | Gly | Ser | Cys | Pro | Leu | Met | Pro |
| | | | 740 | | | | | 745 | | | | | 750 | | |
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755

760

765

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785 790 795 800

Pro Gln Cys Tyr Ala Thr Gln Tyr Gln Asp Tyr Ser Leu Ser Ser Ala
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His Lys Val Ser Gly Met Ala Ser Arg Leu Leu Gly Pro Ser Phe Glu
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Ser Tyr Leu Leu Pro Glu Leu Thr Arg Tyr Asp Cys Glu Val Asn Val
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Tyr Gln Leu Ala His Thr Leu Pro Phe Ala Arg Gly Val Ser Ala His
35 40 45

Leu Asp Lys Ala Ser Ile Met Arg Leu Thr Ile Ser Tyr Leu Arg Met
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His Arg Leu Cys Ala Ala Gly Glu Trp Asn Gln Val Gly Ala Gly Gly
65 70 75 80

Glu Pro Leu Asp Ala Cys Tyr Leu Lys Ala Leu Glu Gly Phe Val Met
85 90 95

Val Leu Thr Ala Glu Gly Asp Met Ala Tyr Leu Ser Glu Asn Val Ser
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Lys His Leu Gly Leu Ser Gln Leu Glu Leu Ile Gly His Ser Ile Phe
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Asp Phe Ile His Pro Cys Asp Gln Glu Glu Leu Gln Asp Ala Leu Thr
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Pro Gln Gln Thr Leu Ser Arg Arg Lys Val Glu Ala Pro Thr Glu Arg
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Cys Phe Ser Leu Arg Met Lys Ser Thr Leu Thr Ser Arg Gly Arg Thr
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Leu Asn Leu Lys Ala Ala Thr Trp Lys Val Leu Asn Cys Ser Gly His
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Met Arg Ala Tyr Lys Pro Pro Ala Gln Thr Ser Pro Ala Gly Ser Pro
195 200 205

Asp Ser Glu Pro Pro Leu Gln Cys Leu Val Leu Ile Cys Glu Ala Ile
210 215 220

Pro His Pro Gly Ser Leu Glu Pro Pro Leu Gly Arg Gly Ala Phe Leu
225 230 235 240

Ser Arg His Ser Leu Asp Met Lys Phe Thr Tyr Cys Asp Asp Arg Ile
245 250 255

Ala Glu Val Ala Gly Tyr Ser Pro Asp Asp Leu Ile Gly Cys Ser Ala
260 265 270

FOOTNOTES

Asp Phe Gln Leu Asn Ala Ser Glu Gln Leu Pro Arg Ala Tyr His Arg
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Pro Leu Gly Ala Val Pro Arg Pro Arg Ala Arg Ser Phe His Gly Leu
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Ser Pro Pro Ala Leu Glu Pro Ser Leu Leu Pro Arg Trp Gly Ser Asp
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Pro Arg Leu Ser Cys Ser Ser Pro Ser Arg Gly Asp Pro Ser Ala Ser
545 550 555 560

Ser Pro Met Ala Gly Ala Arg Lys Arg Thr Leu Ala Gln Ser Ser Glu
565 570 575

Asp Glu Asp Glu Gly Val Glu Leu Leu Gly Val Arg Pro Pro Lys Arg
580 585 590

Ser Pro Ser Pro Glu His Glu Asn Phe Leu Leu Phe Pro Leu Ser Leu
595 600 605

Ser Phe Leu Leu Thr Gly Gly Pro Ala Pro Gly Ser Leu Gln Asp Pro
610 615 620

Ser Thr Pro Leu Leu Asn Leu Asn Glu Pro Leu Gly Leu Gly Pro Ser
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